BLANCHARD RIVER WATERSHED STUDY

DRAFT INTERIM FEASIBILITY STUDY

APPENDIX F

COST ENGINEERING APPENDIX

April 2015

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1.0 INTRODUCTION

This appendix outlines the development of the costs for the Tentatively Selected Plan (TSP) for flood risk management in the City of Findlay, Hancock County, Ohio.

The TSP for the City of Findlay is comprised of structural measures. These measures include a diversion channel from Eagle Creek around the City of Findlay, and a containment levee along the Blanchard River. These measures are described in greater detail in the Engineering and Design Appendix of this report. The TSP includes no nonstructural measures.

2.0 PROJECT PURPOSE

The purpose of the Findlay Flood Risk Management Study was to assess the Federal interest in participating in potential flood risk management plans that in the City of Findlay; formulate and evaluate potential plans; and identify plans which maximize net economic benefits.

3.0 PROJECT LOCATION

The Blanchard River Watershed, a sub-area of the western Lake Erie Basin, is located in northwestern Ohio. The watershed is prone to flooding with significant flood damages repeatedly occurring at Findlay and Ottawa. The repetitive flooding prompted the study authorization which was undertaken as part of a watershed initiative under Section 441 of the Water Resources Development Act of 1999.

The Blanchard River has reached or exceeded major flood stage 23 times since 1913. Of the nine that have occurred since 1990: five are among the top ten stages ever recorded; three have peaked at more than three feet over major flood stage; and one (August 2007) reached a peak stage of only 0.04 feet less than the highest flood stage ever recorded (1913). Damages during the August 2007 event alone were estimated by the Northwest Ohio Flood Mitigation Partnership to be roughly $60 million in the Findlay area and $20 million in the Ottawa area.

Primary development within the study area is residential, with approximately 3,600 residences in Findlay estimated to receive damages in the one percent annual chance flood event.

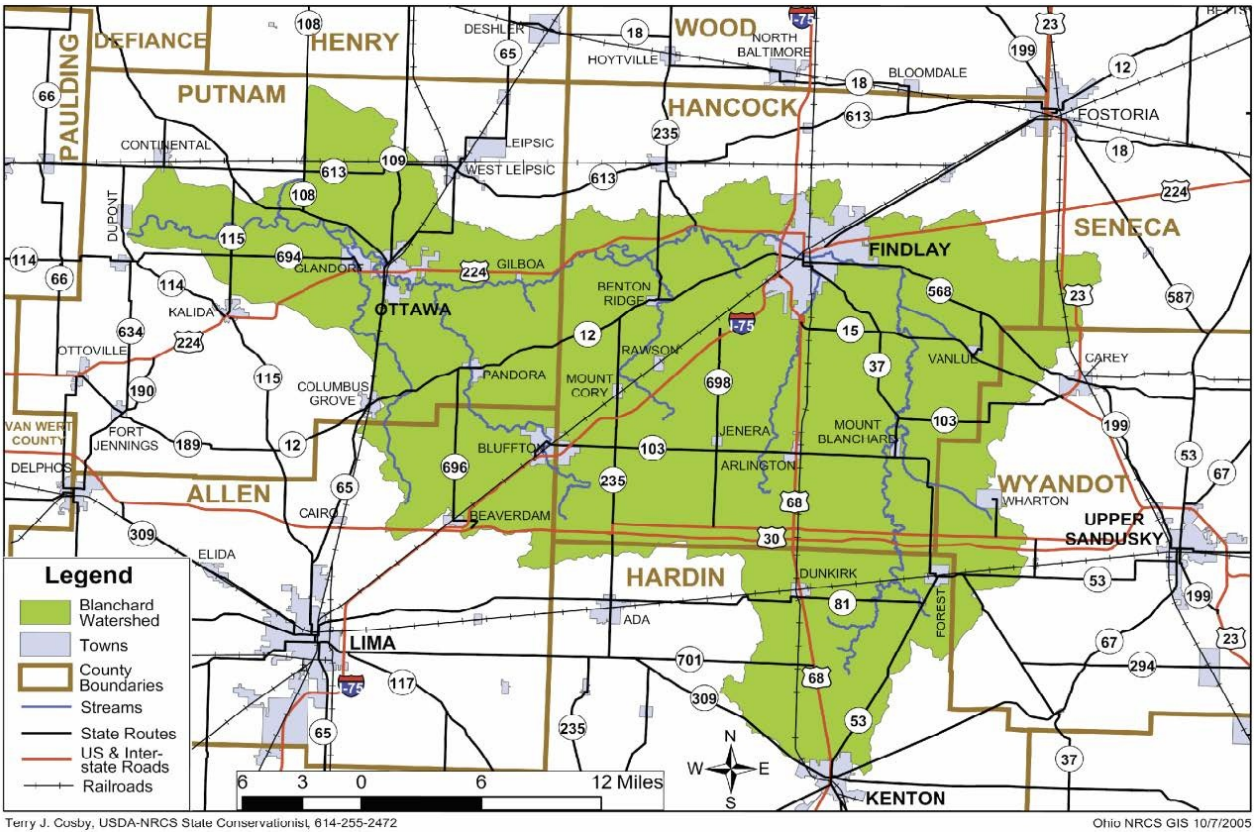


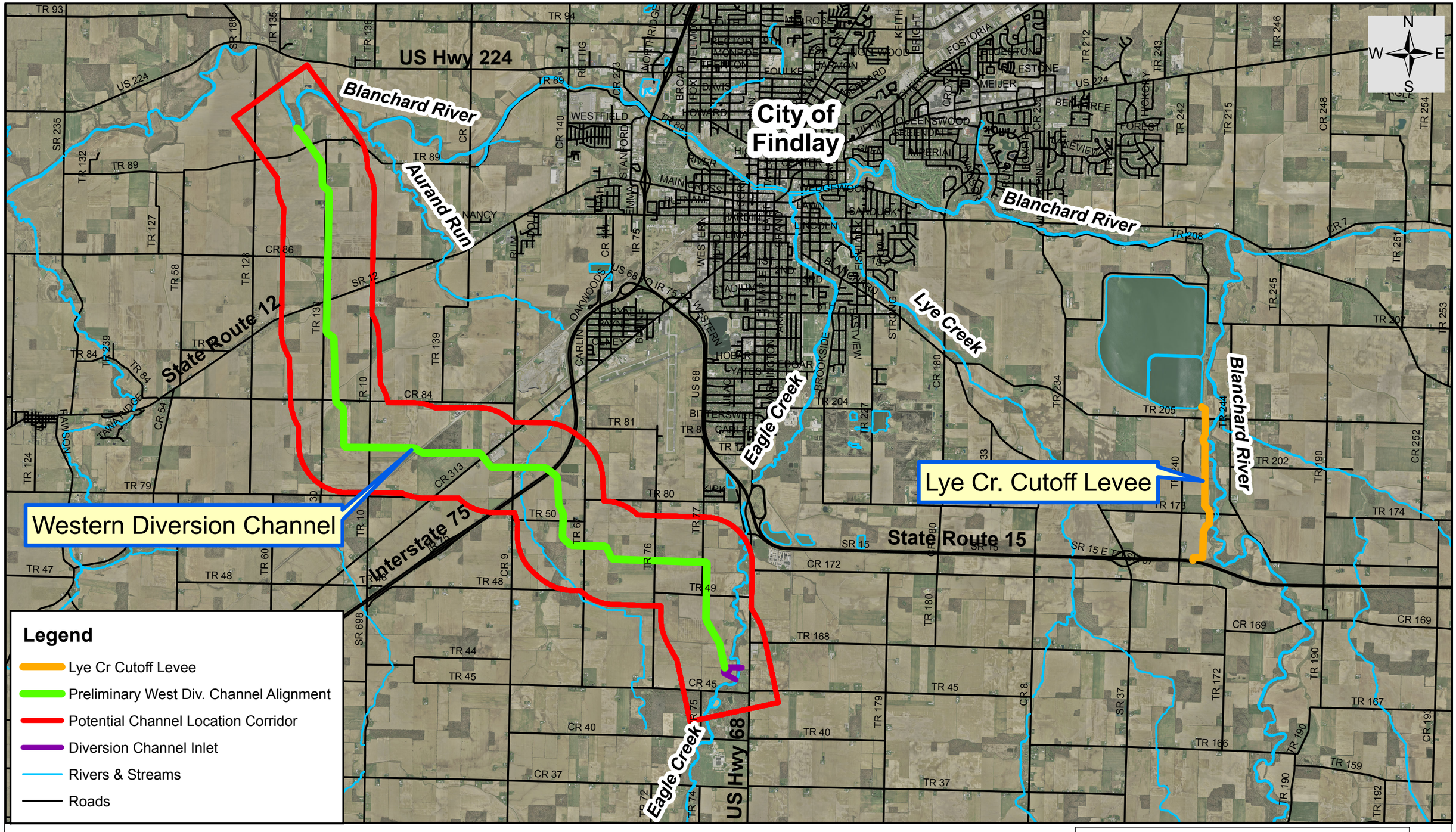
Figure 1 - Blanchard River Watershed

4.0 TENTATIVELY SELECTED PLAN (TSP)

The TSP for the City of Findlay reduces flooding in Findlay primarily by means of the following structural measures:

- Western Diversion Channel (redirects flow around the City)
- Cutoff Levee (diverting floodwaters from flowing across the areas of land between the Blanchard River and Lye Creek)

The proposed locations of these measures are shown in Figure 2. Other necessary items related to these measures, as well as the costs associated with them, will be further developed later in this report. The recommended plan includes no nonstructural components.



Blanchard River Watershed Study
Draft Interim Feasibility Report
Tentatively Selected Plan Layout
December 2014
Figure 2

5.0 BASIS FOR ESTIMATES/RISK ASSESSMENT

Cost estimates were prepared using the SMART Planning feasibility process for a project in the Alternative Formulation and analysis phase. The TSP Milestone for a project at this level requires class 4 estimates that are parametric based offering a consistent approach and a fair comparison. MII cost estimate is not required at this stage.

The parametric cost estimate was developed by the Buffalo District Cost and Project Engineering team using pricing from the URS Interim Feasibility Study, date December 2012. The 2012 price levels for labor, material and equipment offer a consistent approach for fair comparison. Costs were not indexed to 2014 costs. The Construction and Real Estate Current Working Estimates are included as Attachment 2.

The SMART Feasibility Study Process requires an Abbreviated Risk Analysis (ARA), for contingency development, at the TSP stage. The ARA is provided as Appendix G to this report.

6.0 PROJECT COMPONENT DETAILS

6.1 Western Diversion Channel

6.1.1 Diversion Channel Properties

Channel Length:	9.4 miles
Channel Shape:	Trapezoidal
Bottom Width:	35 to 47 feet
Depth:	10 to 16 feet
Side Slopes:	4H:1V

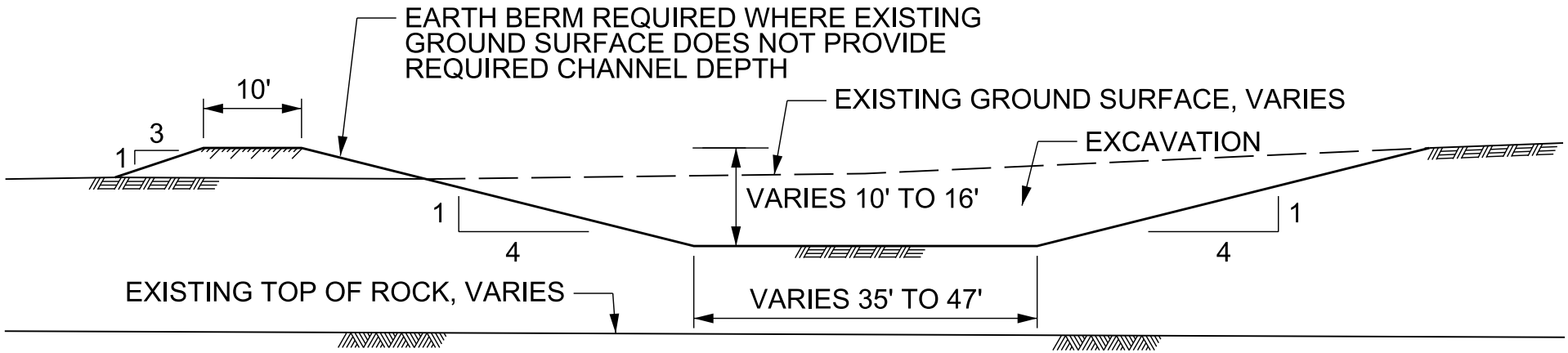
See Figure 3

Where needed, a berm will be constructed alongside the channel if necessary to obtain the minimum channel depth. The height of this berm should not exceed 10 feet. Over 2.1 million cubic yards of excavated materials will be hauled to a quarry. Access roads will be constructed parallel to the channel on both sides.

6.1.2 Water Control Structure

Concrete Box Culverts:	8’ wide X 6’ high (2 each)
Sliding Gates:	8’ wide X 6’ high (2 each)
Earth Embankment:	925 feet long (top elevation 806)
Top Width:	20 feet
Side Slopes:	3H:1V
Earthen Weir:	500 feet long (top elevation 800)

See Figure 4



TYPICAL CROSS SECTION
WESTERN DIVERSION CHANNEL

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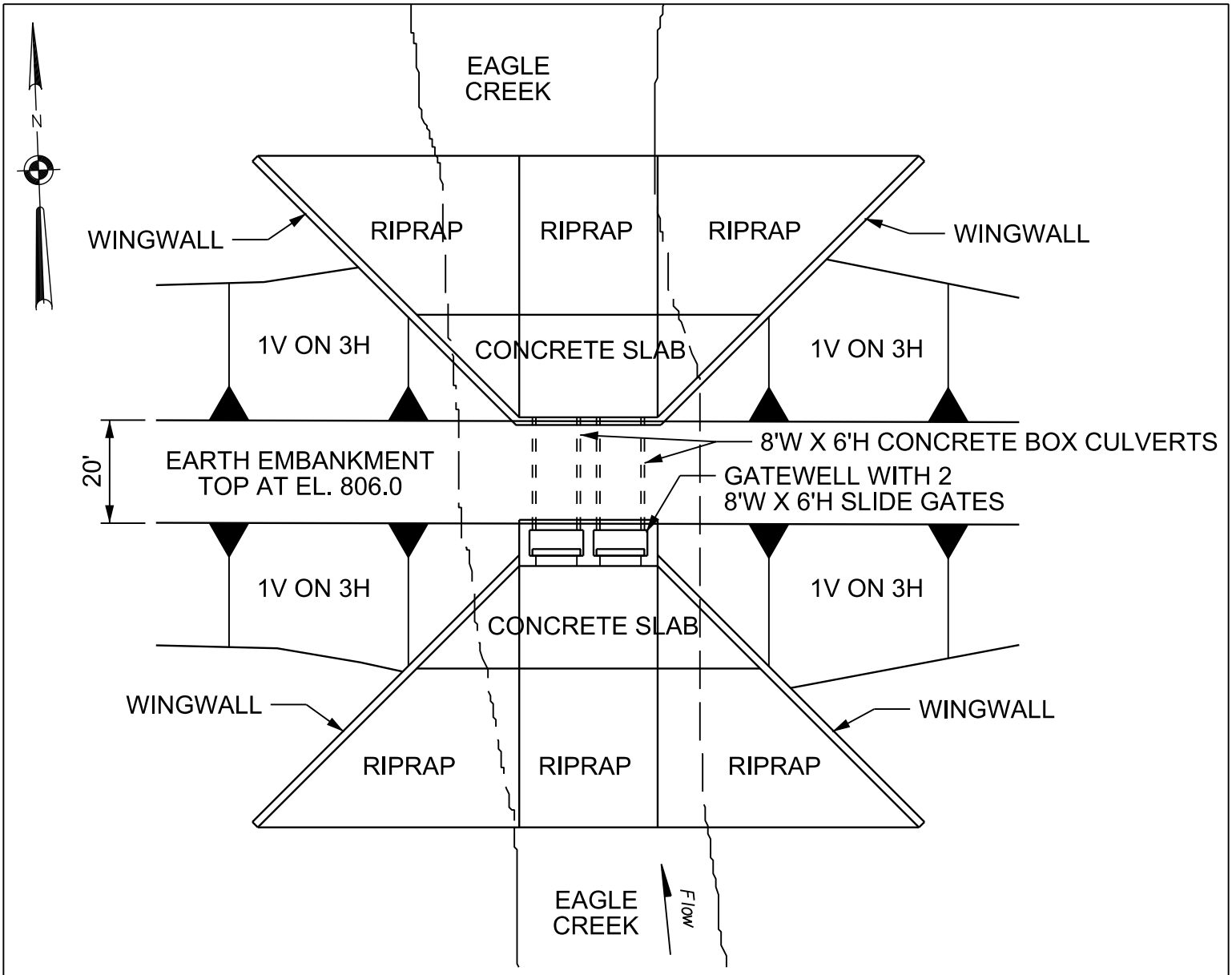
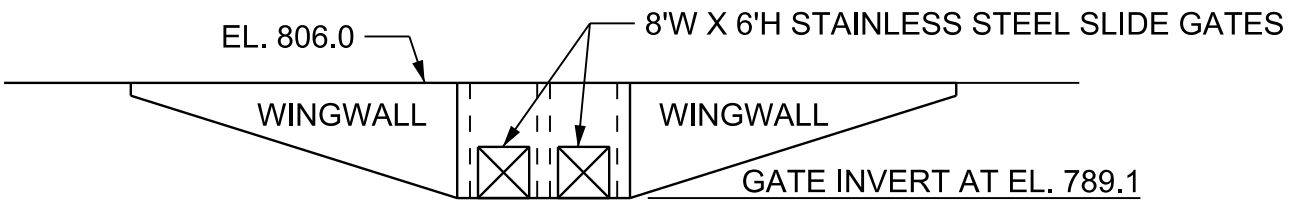
Draft Interim Feasibility Report

Figure 3
Western Diversion Channel
Typical Cross Section



PLAN



ELEVATION

SCALE: 1'' = 30'-0"

Blanchard River Watershed Study
Draft Interim Feasibility Report

Figure 4
Eagle Creek Control Structure

December 2014

6.1.3 Diversion Channel Crossings

There are 8 Township Roads, 4 County Roads, 1 State Road, 1 Interstate Highway, and 1 Railroad that cross the Diversion Channel. Dry Crossings will be constructed for 7 of the Township Roads; the remainder of the crossing will require bridges.

6.1.3.1 Local Road Bridges

Bridge Width:	30 to 44 feet
Channel Bottom Width:	45 to 80 feet
Channel Top Width:	129 to 186 feet

6.1.3.2 State Road Bridge

Bridge Width:	44 feet
Channel Bottom Width:	45 to 80 feet
Channel Top Width:	163 feet

6.1.3.3 Interstate Highway Bridge

Bridge Width:	48 feet
Channel Bottom Width:	80 feet
Channel Top Width:	164 feet

6.1.3.4 Railroad Bridge

Bridge Width:	48 feet
Channel Bottom Width:	80 feet
Channel Top Width:	164 feet

6.1.4 Utility Relocations

Construction of the Diversion Channel will require the relocation of some Fiber Optic Lines and Oil Pipelines. There are multiple abandoned Oil Wells along most of the proposed alignment. Any wells impacted will be closed and/or removed.

6.1.5 Fish and Wildlife Facilities

To compensate for impacts to Fish & Wildlife Facilities during construction of the Diversion Channel approximately 8261 linear feet of stream mitigation and approximately 21.6 acres of wetland mitigation will be required.

6.2 Blanchard River to Lye Creek Diversion Cutoff Levee

The proposed Blanchard River to Lye Creek Cutoff Levee is approximately 9,300 feet long with a 10-foot wide impervious core. The levee alignment shown on Figure 5 is preliminary, final alignment will be based on project requirements. The proposed levee reduces flood damage along Lye Creek by preventing additional diverted flow from the Blanchard River from entering the creek. However, because the flow in the Blanchard River would no longer be reduced by diversion, the cutoff is expected to induce some downstream flooding along the Blanchard River. The levee cutoff has the following properties:

6.2.1 Dimensions

Top Width:	10 feet
Top Elevation:	797.4 to 799.9 feet
Maximum height:	9 feet (above grade)
Side Slopes:	3H:1V

6.2.2 Road Work

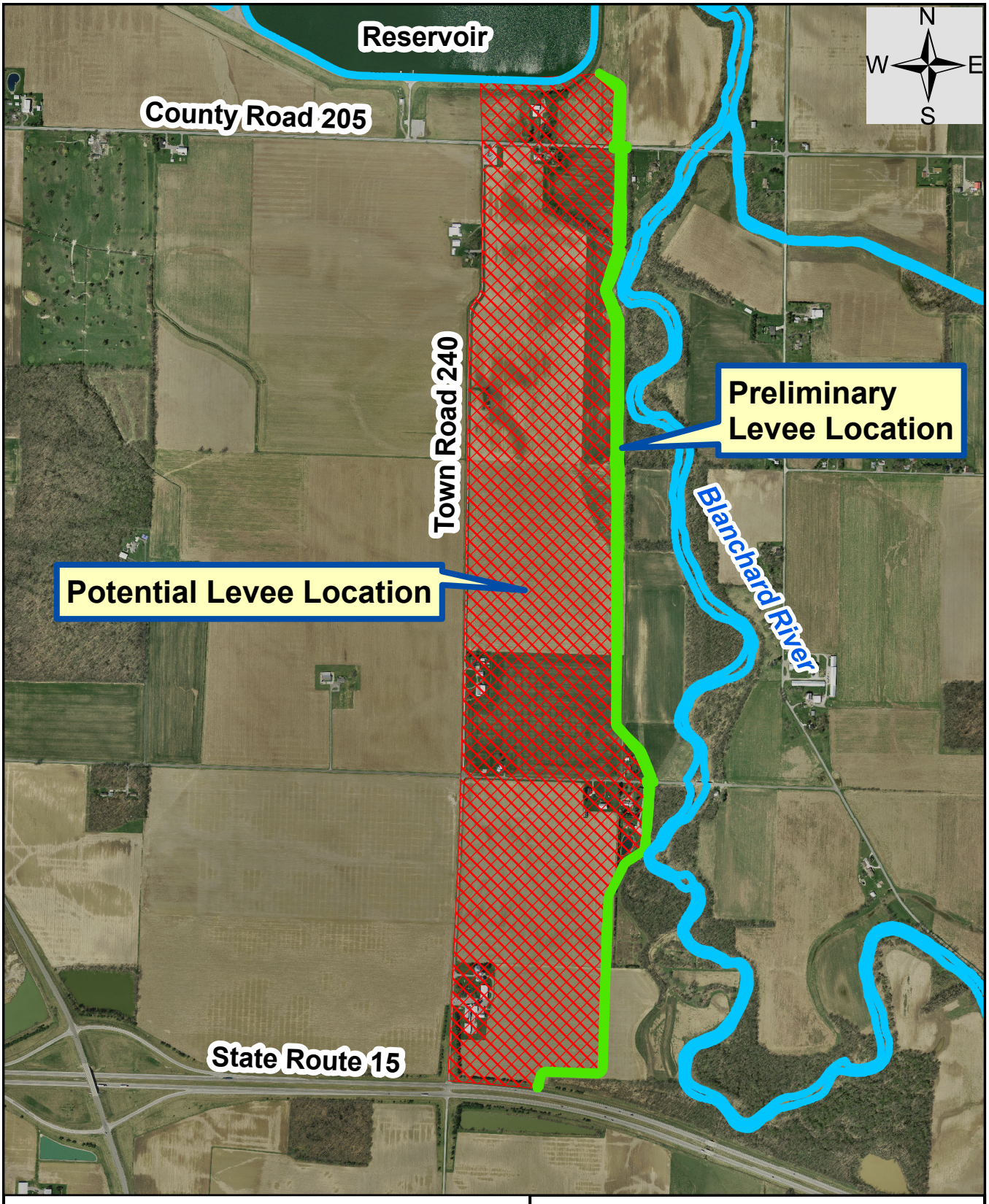
County Road 205 will need to be raised six feet

6.2.3 Easements

A minimum permanent easement of 15 feet on both sides of the levee footprint will be required.

6.2.4 Fish and Wildlife Facilities

To compensate for impacts to Fish & Wildlife Facilities during construction of the Cutoff approximately 1.62 acres of wetland mitigation will be required.



Feet
0 500 1,000 1,500 2,000

Legend

- Preliminary Levee Location
- Potential Levee Location

Blanchard River Watershed Study
Draft Interim Feasibility Report
Lye Creek Cutoff Levee
December 2014
Figure 5

7.0 COSTS

7.1 General

Costs include the acquisition or construction of the project components, as well as the cost of preparation of the Project Partnership Agreement (PPA), contingencies, preconstruction engineering and design (PED), monitoring, engineering during construction, construction management (supervision & administration – S&A), and real estate assessment, administration, and processing.

7.2 Unit Costs

Unit costs for labor equipment and material were developed from RS Means 2012 Heavy Construction Cost Data, Ohio DOT construction projects (Project 110121, March 2011 and Project 110041, Feb 2011), input from the County and cost estimating judgment based on experience. Unit costs are listed in the Unit Cost Summary Table in Attachment 3.

7.3 Labor Rates

Labor rates for the Tentatively Selected Plan (TSP) components are inherent to the RS Means and ODOT data. For the TSP, the labor rates including fringe benefits for the estimates will be taken from the prevailing Davis Bacon wage rates for the State of Ohio, for building, heavy, and highway construction.

7.4 Lump Sum Items

Based on experience, certain cost items such as mobilization and demobilization were assigned a lump sum cost due to the multiplicity of activities required to accomplish those items. These costs are estimated as a percentage of the construction costs, based on accepted cost estimating practice, and/or experience

7.5 Lands and Damages

In order to construct the proposed flood control plan, the non-Federal partner will be required to provide Land, Easements, Rights-of-Way, Relocation, and Disposal Areas (LERRD). The extent and value of the lands required for project implementation are outlined in the Real Estate Plan and includes the following features in the current working estimate (CWE) provided as Attachment 2 of this Appendix: 01 Lands and Damages, 02 Relocations, and 08 Roads, Railroads and Bridges.

7.6 Cost and Schedule Risk Analysis

Guidance from ER 1110-2-1302 Civil Works for Cost Engineering indicates that construction feature contingencies for a Class 3 (Pre-Authorization Alternative Study) level estimate should be between 20 percent and 60 percent. An Abbreviated Risk Analysis (ARA) was conducted by the Project Delivery Team to establish the application of contingencies to properly weigh the uncertainties associated with each major construction cost item. The ARA for this project is included as Appendix G of this report.

7.7 Estimates of Additional Costs

7.7.1 Engineering and Design

Activities associated with the engineering and design effort were calculated at 12% of construction costs (after contingency) plus additional survey costs. This engineering and design cost includes the preparation of Plans and Specifications, as well as pre-construction monitoring and engineering support through project construction.

7.7.2 Construction Management

The cost for construction management (S&A) activities from pre-award requirements through final contract closeout was calculated to be 8% based on standard District formula.

7.7.3 Project Costs

Project costs for the recommended plan are presented in Tables 1 and 2. Quantity and cost information for the TSP components are provided in Attachment 3.

Table 1 – Findlay Diversion Channel Project Costs

Acct Code	Description	Contract Cost	Contingency	Project Cost
01, 02 & 08	Lands & Damages	$16,630,497	$4,492,650	$20,123,147
04	Water Control Structure	$1,241,300	$248,000	$1,489,300
06	Fish & Wildlife	$1,365,065	$303,727	$1,668,792
09	Channels and Canals	$19,674,500	$6,049,400	$25,723,900
18	Cultural Resources	$236,600	$129,742	$353,342
30	Eng & Design	$4,017,366	$1,268,139	$5,285,505
31	Construction Management	$2,678,244	$571,013	$3,249,257
	TOTAL	**$45,830,572**	**$12,062,670**	**$57,893,242**

Table 2 – Findlay Lye Creek Cutoff Project Costs

Acct Code	Description	Contract Cost	Contingency	Project Cost
01 & 08	Lands & Damages	$3,952,900	$988,225	$4,941,125
06	Fish & Wildlife	$40,500	$9,011	$49,511
11	Levees and Floodwalls	$1,624,200	$385,585	$2,009,785
15	Flood Control	$332,400	$66,414	$398,814
18	Cultural Resources	$20,000	$7,182	$27,182
30	Eng & Design	$264,899	$76,715	$341,614
31	Construction Management	$176,599	$34,543	$211,142
	TOTAL	**$6,411,498**	**$1,567,674**	**$7,979,172**

Table 3 – Total Project Costs

Description	Contract Cost	Contingency	Project Cost
TOTAL PROJECT	**$52,242,070**	**$13,630,344**	**$65,872,414**

8.0 COST SHARING

As the non-Federal project partner, Hancock County must comply with all applicable Federal laws and policies and other requirements, including but not limited to:

8.1 Provide all lands, easements, rights-of-way, and relocations (LERR).

8.2 If the value of the partner's LERR contributions, plus the 5 percent minimum cash contribution, do not equal at least 35 percent of the total project cost, then the partner is required to provide an additional cash contribution necessary to equal a total of 35 percent. The partner is required to pay the additional cash contributions during construction at a rate proportional to Federal expenditures. If the value of the partner's LERR contributions, plus the 5 percent minimum cash contribution, exceeds 35 percent of the total project cost, then the Federal contribution is reduced accordingly. If the value of the partner's LERR contributions, plus the 5 percent minimum cash contribution, exceeds 50 percent of the total project cost, the project is cost shared at 50 percent Federal, 50 percent non-Federal cost.

8.3 For so long as the project remains authorized, operate, maintain, repair, replace, and rehabilitate the completed project, or functional portion of the project, including mitigation features, at no cost to the Government, in a manner compatible with the project's authorized purposes and in accordance with applicable Federal and State laws and any specific directions prescribed by the Government in the Operations, Maintenance, Replacement, Repair and Rehabilitation (OMRR&R) manual and any subsequent amendments thereto.

8.4 Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1790, Public Law 91-646, as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way, required for the construction, operation, and maintenance of the Project, including those necessary for relocations, borrow materials, or excavated material disposal, and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

8.5 Provide the non-Federal share of that portion of the costs of mitigation and data recovery activities associated with historic preservation, that are in excess of 1 percent of the total amount authorized to be appropriated for the project, in accordance with the cost sharing provisions of the agreement.

8.6 Do not use Federal funds to meet the non-Federal partner's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds is authorized.

8.7 Preliminary apportionment of cost sharing responsibilities between the Federal government and the non-Federal partner, Hancock County includes costs associated with flood risk management features and environmental mitigation features. The total project first costs are shared on a 65 percent basis by the Federal government and a 35 percent basis by the non-Federal partner. Of the total cost of $65,872,414 as indicated in Table 3, the 65% Federal share of the entire project's total first cost is $42,817,069; the 35% non-Federal share is $23,055,345. The Federal Government will design the project, prepare detailed plans/specifications and construct the project, exclusive of those items specifically required of the non-Federal partner.